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ONE ASPECT OF THE TUBERCULOSIS QUESTION.

Gustaf Regner's International Congress paper, which we reproduce this week, is noteworthy in one particular. It directs attention to a line of work against tuberculosis which, as the author rightly says, has hitherto been neglected. Governments and local authorities have aimed at the detection of tuberculous animals and the creation of tubercle-free centres; but the detection and preservation of herds already tubercle-free has been left to private hands. Such herds exist; and private forethought —including the care of private veterinary practitioners—has done something to keep them free from disease. State encouragement would do more; but the idea of any such encouragement in England has never advanced beyond the region of suggestion.

Of course, our State campaign against tuberculosis, when the war caused its suspension, was still only in the initiatory stage. When it is re-instituted and further developed, this line indicated by Regner should not be overlooked. It is not so important as the suppression of infected animals; but it is none the less far from being unimportant.

A PROBLEM.

There is room for speculation in the profession upon one problem—When the war is over, what changes will it prove to have wrought in us and our work? It would be premature to attempt an answer now; but we may be sure that those changes will be many and varied, and that some will be important. There will be much recasting of our distribution—for, of the unprecedented number of veterinary surgeons now on temporary military service, many will not return to the practices they left. Further, the conditions of practice are bound to alter more or less, and may alter a great deal. There is reason to fear that horse practice will never again re-assume even the importance it retained a year ago. Canine practice, in the years of "inflated prosperity" which we are promised after the conclusion of peace, will probably augment. Cattle practice, considering its trend in recent years, may also be expected to improve; and we are confident as to the future of preventive medicine. Indeed, one immediate effect of the war may be to render veterinary preventive medicine more important than ever before. On the whole we can look forward confidently to the future—but we should remember that, after the war, the profession will take some time to adjust itself to the altered conditions.

A CASE OF OPENED TENDON SHEATH.

Schenkl, of Geiselhöring, records the following case of a draught horse of medium weight. While working in the plough, the animal sustained an injury on the inner side of the right hind limb a little above the fetlock joint, opening the metatarso-phalangeal sheath. The wound was about 2-4/5 inches long, and the perforatus and perforans tendons could be seen lying in it. The finger could be passed round both tendons, and even the smooth sesamoid surface was partially discernible. Lameness was very marked for the first eight days. The highest point reached by the temperature was 102·7° F.

The initial treatment adopted was to well syringe out the wound with strong sublimate solution, and then apply a bandage. A suture was thought superfluous, as the bandage held the edges of the wound in a suitable position and seemed to ensure a sufficiently slight discharge of wound secretion. A protective dose of tetanus antitoxin was given subcutaneously. As it was to be feared that the continuous weight bearing on the left hind limb might cause descent of the pedal bone, some suspensory arrangement was necessary. Slinging was difficult, on account of the structure of the stable. Schenkl therefore gave the horse an opportunity of supporting himself behind by means of a well-padded pole placed across the stall behind the hind limbs. The animal took very well to this, actually "sitting" upon the post, and supporting his body by it. Subsequently the pole was only used during the night.

When the bandage was changed, a copious discharge from the tendon sheath, often coagulated into yellow clots, flowed away. After a fortnight's treatment, the horse bore weight upon the limb so well that he could be brought out of the stable to have the bandage changed.

The wound was treated with various agents—sublimate solution, Lugol's solution, protargol solution, iodipin, and iodvasogen—in turn; and, after eight weeks of treatment it had diminished to an opening the size of a lead pencil, from which an uninterrupted flow of clear yellowish fluid was discharged from the tendon sheath. Various means—cauterisation with silver nitrate, and powdering with sodium bicarbonate and with alum and boracic acid—were adopted to dry up the discharge and close the orifice, but without success. Finally, Schenkl introduced the needle of an injection-syringe deeply into the tendon sheath, and injected a saturated alcoholic solution of tannin. The discharge then stopped; and in a few days the opening was closed. This was three months after the accident.

The horse was now scarcely lame at all when walking, but was so when trotted. The fetlock was still held stiffly, and the region round it remained thickened. The horse was now used for work, which at first was light. Under its influence the condition of the fetlock slowly improved, and the animal became again completely fit for work.—(*Munch. Tier Woch*).

The danger of combining Morphia with General Narcosis.

Walter Straub reports (*Munch. Mediz. Woch.*) the result of investigations upon the action of morphia in combination with general narcotics and sleeping drugs. His views are as follows:—

Morphia exercises a paralysing action upon the respiratory centre, which, when the morphia is used alone, is not very apparent. But when chloroform, veronal, ether, or urethane are used simultaneously with the morphia, the action is increased so as to become dangerous to life. The dangerous action of chloroform and veronal when combined with morphia is explicable. In the case of urethane and veronal, the danger must be explained as follows. Normally, the respiratory centre is very difficult of access for these substances; and only minimal quantities of them reach its cells. But the respiratory centre, when already morphinised, takes up these drugs in considerable quantity.—(*Münch. Tier. Woch.*)

W. R. C.

TUBERCULOSIS—TUBERCLE-FREE HERDS.*

Report by Gustaf Regner, Army Veterinary Surgeon, Chief of the Tuberculosis Bureau of the Royal Agricultural Board, Stockholm. [Abstract.]

Our endeavours against bovine tuberculosis have rightly been called a struggle, a war. The term is justified, not only by the fact that we by those actions aim at an enemy, the tubercle bacillus, but we also use therein tactical measures which in certain respects may be compared to real warfare. We can, for example, divide the struggle against bovine tuberculosis into an aggressive and a defensive struggle. The former has in view the seeking out of tuberculosis and its eradication, or the checking of its ravaging effects, the latter the taking steps to prevent tuberculosis from gaining a footing where it has not been met with or whence it has been driven out. I do not forget, however, that defensive measures should be maintained where an attack against tuberculosis is in progress—that is a matter of course.

It is different, in my opinion, with the entirely defensive measures which are to hold the disease at a distance from non-infected herds. He who has followed the efforts of the last few years, especially such as have found expression in modern legislation against tuberculosis, cannot have failed to note that a most important part of the measures in question has been overlooked. While proper attention was paid to one of the two ways in which tuberculosis gains a footing among the non-tuberculous herds and to the importance of transmission of the disease by milk, the fact that non-tuberculous herds should be protected from infection by tuberculous animals added to the stock seems to have been overlooked.

*Presented at the Tenth International Veterinary Congress London, 1914

As is well known, *Bang*, in his method for combating tuberculosis among cattle, has to a great extent recourse to testing with tuberculin. As one of the many experiences of tuberculosis in an epizootic respect we also count the fact that *many herds are entirely free from the disease*. In this regard we have in Sweden come to results as shown in the following table:—

Number and approximate size of the Herds in Sweden tested for the first time with Tuberculin, and found to be Non-reacting.

Year	1 to 15 animals	16 to 30 animals	31 to 60 animals	61 to 100 animals	Above 100 animals	Total number of herds
1897 to 1898	392	133	40	5	—	570
1899	333	154	41	3	1	532
1900	386	156	30	2	—	574
1901	403	125	9	—	—	537
1902	315	111	18	1	—	445
1903	272	107	8	—	—	387
1904	319	77	18	3	—	417
1905	462	94	8	1	—	565
1906	366	94	8	2	—	470
1907	361	71	15	—	—	447
1908	455	113	11	4	—	583
1909	642	139	14	1	—	796
1910	548	126	18	3	—	695
1911	463	103	19	—	—	585
1912	435	71	8	2	—	516
1913*	535	75	6	1	—	618
Total	6687	1750	271	28	1	8737

* The statistics for this year are not yet definite.

From this it will be seen that the non-tuberculous herds are chiefly to be found among small cattle-owners, but that a number of medium-sized herds are also free from the disease. On the other hand, this happy state of affairs is only exceptional among big herds. To the information given in the table it may be added that a total of 18,655 herds were submitted to the tuberculin test during the years covered by the table, not less than 46·8 per cent. of these being found free from tuberculosis at the first test.

As regards the number and location of these herds in the different parts of the country, they are naturally more numerous in districts where tuberculosis is not so prevalent, but quite a considerable number are to be found where cattle-breeding and milk-farming have been highly developed. Here it is by no means uncommon that a veterinary, when testing two herds simultaneously with tuberculin, finds one perfectly free from tuberculosis, but the other severely affected by the disease.

These facts are without doubt to be met with more or less in all countries where modern cattle-breeding is carried on, although they may not everywhere have been so plainly established. That this must be the case in countries where tuberculosis has on the whole, only gained a slight footing, such as Argentine, Canada, Finland and Norway, goes without saying, But even in countries where, as proven by tests with tuberculin, tuberculosis among cattle is especially prevalent, there are herds to be found which have obviously never, or only slightly been invaded by tuberculosis. Information in this respect is very scanty, owing to the fact that it is most often the tested animals and not the tested herds that are a subject for the calculation of the frequency of morbidity.

In Denmark, from 1893 to 1900 there were found to be non-tuberculous 2203 of 9059 herds submitted to tests, *i.e.*, 24.3 per cent. There are no later statistics than for 1912, when, according to what Professor *Bang* has written to me, 277 herds were submitted to the first test, 129 of these, or 46.6 per cent. proved to be free from

tuberculosis. In Germany (the Rhine province) *Krautstrunk*, upon examining 32 herds with tuberculin in 1911, found 24 of these, with a total of 690 animals, quite free from tuberculosis. I have been unable to secure information for later years, but *Krautstrunk* has written me, amongst other things: "We have had very good experience from the tuberculin tests."

As regards Great Britain, it is true enough that I have no similar information, but the experience from the time Sweden imported pure breds from there strengthens the supposition that there are also herds in Great Britain which have not been infected by tuberculosis. That this is the case with regard to Jersey cattle is a well-known fact, but Swedish farmers also imported numbers of Ayrshire cattle, and as our laws since 1898 provide that the animals, on their arrival in Sweden, must be non-reacting, importers soon learned to seek out herds in Scotland where the animals did not re-act to the tuberculin test. Since 1898 these imports have proved successful as far as tuberculosis is concerned. I even know of a case when an entire stock of about eighty beasts was imported in 1902. They have ever since been tested annually with tuberculin and have always been found non-reacting.

It must be generally admitted that, in a struggle of any kind, every favourable chance must be noted and taken advantage of. Applied to the war against tuberculosis among cattle this means *that the non-tuberculous herds should be sought out and protected from infection.* We must therefore first and foremost ascertain where the herds in question are to be found. Knowledge hereof cannot alone be gained by testing with tuberculin. Theoretically, it would undoubtedly be correct to introduce obligatory tests with this agent, but as this would mean rather serious inconvenience it is not possible, at least for the present, to recommend such a line of action.

Concerning measures against bovine tuberculosis it is necessary to feel one's way carefully, and for my part I wish to accentuate what the Board of Agriculture in London states in this regard in a circular of February 17, 1913, on tuberculosis, in paragraph 5 of which it says: "It is abundantly clear at the same time, that any operations aiming at the diminution or eradication of tuberculosis in animals must be commenced with caution, and carried out with due regard to the extent to which the disease is believed to exist amongst cows, and to the importance of securing the continuance of an adequate milk supply, and also of avoiding any disorganization of the important industry concerned."

The end in view, *i.e.*, protection of the non-tuberculous herds from infection, cannot therefore be fully attained for at least a considerable time to come, but I am sure that much can be gained if farmers are *encouraged* to avail themselves of tuberculin tests. This is at least our experience in Sweden. There every farmer is entitled to a *first* test of his herd with tuberculin without charge or obligation, and in this manner we have succeeded in raising the non-reacting herds formerly mentioned. The entire movement has therefore been *voluntary*. To begin with, it has been taken for granted that the war against tuberculosis requires the co-operation of as many interested parties as possible, and the right in question has also had the effect of creating great interest among farmers. In connection with a test with tuberculin, the farmer receives advice and information from the veterinary, and, when the test has proved the absence of tuberculosis in the herd, it is usual to find his interest awakened to endeavour to protect the herd from infection—an interest that could hardly exist so long as he did not know for a certainty that it was non-tuberculous. This, again, does not fail to interest his neighbours, and more farmers join in the struggle.

Of the advice given to the farmer whose herd has been found to be non-tuberculous, it should only be necessary to mention in this connection, that he should not incorporate with his herd, by purchase or otherwise from without, any animal not perfectly healthy and *non-reacting*. He is *not* therefore advised to feel satisfied with the animal not being *clinically* tuberculous, for this is a *dangerous* piece of advice in cases where the object in view is the prevention of tuberculosis spreading to non-infected herds.

It is an irrefutable fact that the majority of tuberculous animals do not show clinical signs of the disease, and do not constitute any danger during their entire lifetime as far as infection is concerned, but we must not conclude from this that an animal, clinically non-tuberculous, can be placed with impunity in a non-tuberculous herd. We are obviously unable to guarantee to the owner that it will not in future become infectious, and we are just as little able to assure him that we shall step in at the moment the closed tuberculosis becomes open, and in this manner ward off the disastrous results. It should be noted that I have here counted on the clinical method of examination being infallible; this, as is well known, is not the case.

If we penetrate further into the question before us we arrive at two points of view which, in my opinion, are of immense importance, namely, that if farmers are strongly encouraged to make sure how matters stand as regards tuberculosis in their herds, it will naturally not only follow that non-tuberculous herds will be discovered, but also that a number of tuberculous stocks will be found. We shall then become aware of the fact *that many tuberculous herds are very slightly affected by the disease.*

To illustrate this:—From my publication regarding the struggle against tuberculosis in Sweden up to the year 1909* it is seen that of the originally tuberculous 832 herds, which were then engaged in the struggle against tuberculosis, there were 375, or 45·1 per cent., in which only 1 to 3 animals reacted at the first tuberculin test. These 375 herds numbered 11,876 animals, and the herds therefore averaged 32 animals. According to a later calculation made for this report, there were found from 1909 to 1913 2,703 herds in all, which, on being submitted to a *first* test with tuberculin, proved to be suffering from tuberculosis. Among these herds there were 1,311 or 48·5 per cent., in which only 1 to 3 animals reacted. These 1,311 herds numbered 20,960 animals, and the herds therefore averaged sixteen animals.

A similar state of matters undoubtedly prevails in other countries, and it should be manifest that it involves such a favourable factor in the struggle against tuberculosis that it must be attended to and made use of. In the cases where tuberculosis is not more prevalent than mentioned above, it naturally only requires a very slight sacrifice on the part of the owner to have the herd transformed *at a single stroke* from a tuberculous to a non-tuberculous one. But how is it possible for an owner to feel himself called upon for such sacrifice if he does not *know* how favourable matters are with regard to the presence of tuberculosis in his herd?

Another point of view deserving attention is the importance of preventing as far as possible the transmission of bovine tuberculosis to human beings. At the International Dairy Congress in Berne this year, I have especially pointed out this urgent matter, and I take the liberty to repeat in all brevity what I have said in this respect.

Researches in tuberculosis during the last twelve years have finally proved that bovine tuberculosis, under certain conditions, attacks human beings. I do not

* "Erfahrungen über Rindertuberkulosebekämpfung," Stockholm, 1911.

think I am mistaken when I say that the majority of experts now take a standpoint on this question which can be roughly expressed in the following sentences :—

(1) Human tuberculosis chiefly arises from infection from man to man.

(2) Human tuberculosis can also have its origin in infection from cattle with open tuberculosis, especially tuberculosis of the udder.

(3) Where transmission of tuberculosis from cattle to man has taken place, milk has in most cases been the agent and the human being has been an infant.

(4) A war against human tuberculosis must first of all aim at prevention of transmission of the disease from man to man, but at the same time, such arrangements as are necessary to render infection from cattle to human beings impossible must not be neglected.

The chief weight in the prevention of the transmission of tuberculosis from cattle to human beings, must therefore be attached to preventing cows' milk, intended as food for children, from containing live bovine tubercle bacilli. The measures necessary for this, however, cannot alone consist in fighting the open forms of tuberculosis, as the realization of such a struggle meets with so many practical difficulties that the result must suffer considerably from it. *It cannot possibly be recommended to use as suitable for children the milk produced in a tuberculous farmyard, where more or less successful attempts are being made to keep a sharp eye upon the cases of open tuberculosis.*

It must therefore be of importance for public hygiene to have the non-tuberculous herds searched for, and as far as possible taken advantage of for the production of milk which, granting it fills other hygienic requirements, can bear the important characterization of *children's milk*. The non-tuberculous stream of milk, however, must be widened and deepened in order to be of benefit to more and more children. Public sanitation should, therefore, endeavour to promote in every possible manner the raising of non-tuberculous herds, and for this purpose first of all direct their efforts towards such herds as are slightly affected by tuberculosis.

It has been my desire in the foregoing to point out the necessity of noticing, and, as far as possible, making use of the favourable factor in the struggle against tuberculosis. This factor is indisputably to be found in the fact that there are numerous herds which are free from tuberculosis.

It must not be expected, however, that farmers will take the initiative by themselves in this respect. *The defensive side of the tuberculosis struggle also requires support and guidance from higher quarters*, this so much the more as the herds here in question often belong to the less intelligent and, financially, less favoured farmers.

In my opinion the Government must therefore render assistance in this part, by letting the farmers have tuberculin tests free of charge and by veterinary surgeons giving them all necessary advice and information.

On account of what I have said, and in the event that a resolution on the tuberculosis question be submitted to the Congress for adoption, I submit that same may contain the following thesis :—

Those herds which are naturally non-tuberculous must be searched out and in every manner protected from infection. At least the expenses in connection with this ssarching should be defrayed by the Government.

Owing to a severe sleet storm in St. Louis early in February, which left the streets one sheet of ice, more than a score of horses had to be destroyed, having broken legs or been otherwise injured.

TREATMENT OF WOUNDS IN WAR.

The Hunterian oration delivered before the Royal College of Surgeons of England on Feb. 15th, 1915, by Sir W. Watson Cheyne, Bart., C.B., F.R.S., LL.D. Edin., President of the College (With Illustrative Plate.)

[The Oration commences with a reference to John Hunter's Army service, and a *résumé* of the methods of treating wounds in recent wars—1870, 1877, 1894, 1900, 1905—followed by notes on Lister's methods. Though not, pethaps, of immediate application to veterinary work in the field, the subject is of importance as a contribution to the advance of surgical methods.]

"One result of Lister's teaching is that, apart from strict aseptic work (and by that I mean work which ensures asepsis in a wound quite apart from whether antiseptics are used or not), everyone who has to deal with wounds takes care or ought to take care, by disinfecting the instruments before being used for a fresh patient and avoiding infection of dressings, etc., not to carry organisms from one patient to another. My view is that the chief explanation of the less virulent sepsis which is present in these wounds to-day and to which surgeons point with considerable self-satisfaction, and indeed most that has as yet been gained from modern methods of wound treatment in the case of war, is the result of this simple cleanliness rather than of improved treatment of the wounds themselves.

"In speaking of sepsis and septic wounds I refer to the conditions (suppuration, cellulitis, septicæmia, pyæmia, osteomyelitis, and so on) brought about by the ordinary pyogenic organisms. Whether the amount of disturbance caused is much or little, a wound in which these organisms are growing freely is a septic wound. In the present war, I fancy, attention is chiefly concentrated on the foul smell of the wounds and on the occurrence of tetanus and acute spreading gangrene rather than on the suppurative condition. Now, foul smell in a wound does not mean anything much worse than a septic wound without a foul smell. The odour is due to the presence of some organism (generally a saprophyte) which produces foul-smelling gases, and though they may increase the amount of toxins absorbed they are easily got rid of by irrigation, free drainage, etc. Tetanus and acute spreading gangrene, again, are independent diseases which happen to get into the wound along with soil, and are to a certain extent independent of the question of sepsis, although they seldom occur in wounds which are not also septic. Further, these diseases, though very terrible, are comparatively rare.

"In a note issued to the medical staff in December it is stated that 0·2 per cent. of the wounded had been attacked by tetanus among the troops in France, and that some further cases had developed after the arrival of the wounded in this country. In recent wars the number of cases of tetanus has averaged less than 1 per cent. of the wounded (varying from 1·2 to 0·26 per cent.) The proportion of acute spreading gangrene is is somewhat greater, but we may take it that at most only some 3 per cent. of the wounded will probably be affected with these diseases. Tetanus and spreading gangrene are very terrible diseases, and hence, no doubt, the reason why undue prominence is being given to them : but what I am trying to work out is how best to deal with the other 97 per cent. of the wounded so as to avoid the much more common and often very serious sepsis. Incidentally I think it will be found that in concurrence with the disappearance of the septic diseases the proportion of cases of tetanus and acute spreading gangrene will also diminish.

Consideration of Methods of Treatment.

It seems to me that there are theorectically three ways in which we may opose the attacks of the parasitic invaders: 1. To strengthen the natural protective forces in the body to such an extent that they may be able to resist and destroy the invading organisms. 2. To destroy the organisms after they have broken through the natural defences of the body and have established themselves in the injured part or the body generally. 3. To prevent the growth of or to destroy the organisms at their point of entrance into the body before they have had time to establish themselves there.

The Strengthening of the Natural Defences.

The first point raises the very difficult question of immunity and the action of toxins introduced into the body by the surgeon—the so-called vaccines. These questions are much too obstruce for me to go into to-day, if indeed I were competent to do so, and besides they are very far from being worked out; indeed, the theories of this year may very probably not be the theories of two or three years hence. I may, however, say a few words as a clinician on the way in which the matter so far strikes me in reference to the question under consideration.

In former years the use of vaccines was advocated as a prophylactic measure, a certain amount of immunity being produced, or the existing amount of immunity being increased, by setting up a mild attack of the same or of a closely allied disease. This was the process of inoculation and later of vaccination against small-pox, the latter being produced by setting up a mild attack of a similar disease (if not the same disease), viz., cow-pox, and the value of this measure is universally acknowledged except by a few cranks. The first to extend the process to bacteric diseases was Pasteur, who by the previous injection of organisms, weakened as regards their virulence, was able to induce a considerable amount of protection against the assaults of living and more virulent bacteria of the same kind. Thus he was able to vaccinate chickens against chicken cholera, and sheep and cattle against anthrax. At the present time antityphoid inoculations are being very largely employed and, in the opinion of those best qualified to judge, with great advantage. Prophylactic inoculations have also been employed against cholera and against plague. These attempts to raise the immunity of an animal before infection, and thus to enable it to resist the infection better than one that has not been vaccinated, are thoroughly logical and most promising, and they seem to me to be the proper sphere of vaccine work. It must, however, always be remembered that there is no such thing as absolute immunity and that the increased immunity afforded by the vaccines can always be broken down by a sufficiently large dose of the bacteria.

Of late the attempt has been made on a gigantic scale to employ vaccines not merely as a prophylactic measure, but also in the treatment of disease (these vaccines being composed of the dead bodies of the bacteria with their toxins). This is quite a different principle from that on which vaccines were first introduced, and when it is proposed to rely on this treatment for the recovery of those wounded in war the matter requires very careful consideration. I have always felt rather sceptical as to the possibility of raising the immunity by this plan in cases where the disease is actually in progress. The fact that the disease is present shows that the natural immunity of the body has been more or less overcome, and the general view is that this has been brought about by toxins produced by the invading organisms and absorbed into the system. If this be true, the question very naturally presents itself. How can this immunity be restored by the injection of more toxins of the same kind? I can see no essential difference between the absorption of toxins from a wound and the injection of the same toxins from a bottle. If the quantity absorbed from a wound has broken down the resisting power of the body, how can it be restored by the subsequent injection of more toxins from a flask? I know that bacteriologists try to defend their position, but the arguments put forward its its support are purely theoretical and are very obscure.

What support is there from clinical experience in favour of the employment of vaccines for treatment as apart from prophylaxis? Just think how many millions of vaccine injections have been made in the course of the last few years, and in how very few cases we can definitely recognise an immediate and marked improvement, as we ought to do if the treatment is to be justified. Think also, how often we are in doubt whether such improvement as occurs in the course of the treatment is due to the vaccine or is a natural result of the actions of the body. Think again in how many cases (the vast majority, indeed) there is no apparent action at all. I have used vaccines extensively (employing the services of bacteriologists for the purpose, so that I should not feel that I had not been carrying out the treatment properly), and I have in only two or three cases seen any result which I should not have expected without their use. I have seen lesions getting well in one part of the body and yet, while still under vaccine treatment, fresh lesions breaking out in other parts of the body, and I have also seen bad and even fatal results follow the use of vaccines. All I would say as regards the place of the first method in the case of wounds in war is that while I would welcome vaccine injections as a prophylactic measure, I think they are very broken reeds to trust to once the organisms have established themselves in wounds.

Destruction of Organisms in the Body.

"Intermediate between (1) and (2) we have the use of antitoxic sera. Here antitoxins are introduced into the blood which destroy or neutralise the toxins of the bacteria, and the latter, when deprived of their weapons, soon fall an easy prey to the defensive arrangements of the body. The typical example of this is antidiphtheritic serum, which, if given early enough, leads to very rapid arrest of the disease in a way which is not seen in vaccine therapy. In the case of tetanus the antitetanic serum seems also to be very beneficial in some cases, if used immediately after infection.

As to the direct destruction of bacteria by chemical substances or chemotherapy, we have imperfect examples of this in the treatment of malaria by quinine and of syphilis by mercury, and still more definitely in the treatment of syphilis by salvarsan. Whatever may be the value of salvarsan as regards the complete cure of syphilis the immediate effect is most striking and is evidently the ideal to be sought for in the medical treatment of any infective disease.

"I sincerely hope that Prof. Ehrlich, who, whatever may be thought of German Kultur in general, is the great pioneer in this work and to whom it would be difficult to find a successor, will still be able to go on with his work and will not be crippled in health or opportunity by this war. I may be prejudiced, but I look on Prof. Ehrlich as the greatest medical asset that the world possesses at the present time.

Lister's Methods.

His *first* plan was to introduce impure liquid carbolic acid into the wounds, stir it up with the blood, and leave it there, painting a little of the acid on the surface of the blood clot from time to time. The result of

that plan was the complete revolution of surgery; his compound fractures behaved like simple fractures, there was no inflammation, suppuration, or sloughing, and none of the septic diseases such as phagedæna, erysipelas, pyæmia, etc., which were so common in his wards up to that time. What also struck Lister as most extraordinary, and what he was always remarking on, was that tetanus also disappeared, although it had been previously quite common in his wards. He had no idea until many years later that tetanus was an infective disease, but he frequently remarked that suppuration was somehow or other concerned with its onset because he had had no cases since he ceased to have suppuration in his wounds. Had the effect of undiluted carbolic acid been to cause extensive sloughing and to favour the growth of pathogenic bacteria, as some of our workers in laboratories tell us is the case, Lister's experiments would have failed and been abandoned and the revolution in surgery might not even yet have taken place.

The *second* stage, after Lister had given up the use of the undiluted carbolic acids in wounds, was to wash out compound fractures very thoroughly with 1 to 20 carbolic lotion, a catheter being attached to the syringe and passed into all the recesses of the wound, so that no part should escape the action of the antiseptic. It was found, however, that the results were not so uniformly good as in his original method, especially if the wounds were much soiled, and so his *third* plan was, in addition to washing out the wound with 1 in 20 carbolic lotion, to clip away the soiled tissues and apply undiluted carbolic acid to those parts. This is the plan which I have used for years and which has proved very satisfactory. Under the present circumstances in the field, however, I suggested a *fourth* plan—viz., in addition to clipping away the soiled parts, to apply the undiluted carbolic acid to the whole surface of the wound, opening it up if necessary.

My main idea in making this suggestion was in order to ensure that the whole surface of the wound should be subjected to the action of the antiseptic, and that no recesses should escape, as might very easily be the case if the wound were only syringed out. A further idea was that the carbolic acid might, so to speak, "pickle" the tissues and so prevent the growth of micro-organisms in them till such time as the defensive action of the tissues had come fully into play. That the procedure is a severe one and open to several objections I readily admit; the great objection, to my mind, being the risk, in the case of large wounds, of absorption of the carbolic acid to a disagreeable and even dangerous extent. At the same time, considering the evils of sepsis, the risk, which is really not very great, is worth taking if no better way can be found.

Difficulties in Disinfection of Gunshot Wounds.

Some surgeons take a hopeless view of the disinfection of gunshot wounds and think that disinfection is impossible of attainment. That it is quite possible and comparatively easily obtained in accidents in civilian practice is a fact which cannot be denied. Why, then, should gunshot wounds be so hopeless? I think the idea is probably founded on experiments by Lagarde and others carried out a good many years ago. . . . . I may say that the experiments, so far as I read them, are not convincing and I am not prepared to accept them without fresh and careful repetition.

A further reason given is that the sides of the wound are so deprived of vitality that they must slough. But dead tissue in a wound does not slough if the wound is aseptic; indeed, we constantly put dead substances into wounds, such as ligatures of all kinds, pieces of bone, etc., and they do not separate if they are aseptic. In many accidents in civil practice the tissues are equally badly contused, and yet if disinfected early and thoroughly the wound follows an aseptic course and the bruised tissues do not slough. Sloughing of bruised tissues is due to infection of these tissues. Anyone who followed the course of the bullet wounds in the South African War and remembers how frequently they healed without sloughing or suppuration will, I think, doubt the soundness of the view that gunshot wounds must slough and that bacteria are driven into the tissues to such an extent that sepsis must occur.

A third point which is being urged just now is that almost immediately after infection the infective organisms may be found in the blood of the heart. This may be true as regards guinea-pigs and bacteria which produce general diseases, but I want some further confirmation of it in regard to man and local diseases such as those we are dealing with. Even if it were correct in the case of man that some organisms do find their way from the wound to the heart very quickly, it is not these that one has to fear in the case of septic wounds. It is the bacteria that establish themselves in the wound, dig themselves in, and then proceed to pour out their toxins, that one has to guard against.

In my paper at the Medical Society I especially referred to two great difficulties which stood in the way of any thorough disinfection of the majority of gunshot wounds. The first was the large number of cases which may come under treatment at any one time.

The second point which I emphasised was the length of time which might elapse between the receipt of the injury and thorough disinfection, and the consequent failure of any attempt at disinfection owing to the growth of bacteria in the wound in the interval. With regard to this point I made one or two tentative suggestions. . . . . I said we had been trying at Chatham to make soluble bougies or suppositories containing carbolic acid which might be pushed into wounds and delay the sepsis, or that, as an alternative, we might push in swabs soaked in iodine and leave them there; but I made no definite suggestion, for the simple reason that I had no definite facts to go upon.

Committee of Investigation: Nature of the Problem.

I have taken up this problem very seriously since that, and at the suggestion of Sir Arthur May, the Director-General of the Naval Medical Service, have formed a little committee consisting of Fleet-Surgeon Bassett-Smith, the well-known bacteriologist in the Naval Medical Service, Mr. Arthur Edmunds, who has worked with me for years, and who is also attached to the Royal Naval Hospital, Chatham, and myself. . . . . To-day I propose, with the consent of the Director-General and of my colleagues, to make a preliminary communication on our work, and to mention some of our experiments, and I hope you will remember that though *I* speak, what I say is the result of our joint work and not of my own alone.

"The problem which we set ourselves was whether it was possible to introduce an antiseptic into a wound soon after its infliction which would remain there, diffuse into the blood and tissues, and inhibit the growth of the bacteria till such time as the wound could be thoroughly disinfected.

"We may syringe out a wound with antiseptic lotions without rooting out the bacteria, for they may be lying safely protected by a piece of bone or tissue or blood clot, and that is the reason why I advised opening up the wounds if necessary and applying the antiseptic methodically to the whole surface of the wound. And the syringing may damage the tissues without accomplishing its object, and may only enable the bacteria to get a firmer hold.

"Now I think that something of this kind would be the best way of attacking the bacteria in these wounds—that is to say, instead of syringing out the wound,

which, if done in a hurry or incompletely is futile—to introduce an antiseptic into the wound and leave it there to diffuse over the whole wound and inhibit the growth of the bacteria till the patient can be brought to the field hospital. It was with that idea in my mind that I spoke of bougies or iodine in November, and that is the problem which we set ourselves to solve."

The investigations indicate some of the points which had to be considered:—a method of estimating the diffusibility of antiseptics in blood clot, and their action on the bacteria in or on that clot; the form in which the antiseptics should be used in wounds; the action of a variety of antiseptics in various media; what strengths these antiseptics could be left in wounds; finally, to test, as far as possible, their action in animals and in man. They say, "This last part of our research is still very incomplete, but we have learned a good deal about antiseptics which we did not know before, and therefore I hope this short preliminary communication on our work will not be without interest to you."

Media and Antiseptics.

"An essential point is that the antiseptic should remain in the wound and not escape from it at once; it is not a transitory action but a more or less continued one that is required. For this reason, therefore, watery, alcoholic, or oily antiseptic solutions were discarded, however efficient they might be from an antiseptic point of view. This left us with various pastes or ointments, and powders. We chose pastes, and we have made a large number of experiments, with the view of deciding what would be the most suitable basis with which to combine the antiseptic. I may say that, as far as we can judge at present, the most suitable basis from every point of view is one consisting of six parts of lanoline to one part of white wax.

The following were the chief substances tested: Carbolic acid. Tricresol (o.m.p. cresol, as Martindale labels it). This consists of the three cresols—ortho-, meta-, and para-cresol—which have very nearly the same boiling point and pass over together in the distillation of coal-tar products. Various proprietary substances which are used by surgeons in which the tricresols or allied substances form the active agents, but are mixed with other products of distillation and with varying quantities of soap so as to form an emulsion. Such were izal, cyllin, hycol, and lysol. Liquor cresolis saponatus (or English lysol made with pure redistilled tricresol, Martindale). Bichloride of mercury. Iodine. Salicylic acid. Salicylic and boric acids (1 to 3), a powder much used in the Russo-Japanese War. The double Cyanide of mercury and zinc. Paraform. Turpentine. Various essential oils, especially oil of origanum, oil of cinnamon, and oil of eucalyptus. Alcohol. Various colloidal substances (mercury, silver, gold, selenium.) Balsam of Peru, friar's balsam, and Dr. Mencière's embalming fluid.

We have tested their diffusibility and inhibitory power as regards growth, and also the antiseptic power (i.e., the power of actually killing the bacteria) in blood clot and also on nutrient agar. As a matter of fact, we find that the diffusibility and antibacteric power of most of these pastes are much the same in nutrient agar as in blood clot, and for demonstration purposes agar is far more convenient.

Description of Methods

Speaking generally, the plan which we have ultimately adopted as regards agar, is to place the antiseptic paste to be tested on the bottom of a Petri dish underneath a slab of nutrient agar and to paint the upper surface of the agar with an emulsion of bacteria of various kinds according to circumstances. We were then able to judge of the diffusibility and activity of the antiseptic by observing the growth or absence of growth of the bacteria which we had planted. . . .

We always use the same quantity of the paste by weight, either half a gramme or one gramme as we wish. This is placed on an ordinary microscopical cover glass, either ¾ or 1 inch in diameter, which is applied to the centre of the under surface of the slab of agar. In this way the antiseptic is applied to the same definite area (¾ or 1 inch) of the agar in all cases. . . . .

We have chiefly employed the ordinary pus organisms, the staphylococcus pyogenes aureus, but we have used micrococcus prodigiosus and also bacillus subtilis so as to study the effect on spores.

Results of Experiments.

"I now show you some of the results. First, a series in which the surface of the agar was brushed over with an emulsion of staphylococcus pyogenes aureus, the antiseptics being incorporated in the lanoline and wax base.

The first specimen is a control where no paste has been applied, and you will see that the whole surface of the agar is pretty uniformly dotted with colonies of the staphylococci. As a marked contrast with this I show you next a plate where a paste containing 30 per cent. of cresol has been used, and you will see the large clear area in the centre where no growth has occurred and the very narrow fringe of small colonies around the edge of the agar.

Iodine.

"I here show you plates where the paste contained 2 per cent. and 6 per cent of iodine. There was no use in going higher because even these pastes cause marked irritation of the skin, and when we reach 10 per cent. the paste left on only 2½ hours caused almost complete destruction of the skin. Here you see that the iodine has not diffused at all, and that luxurious growth has occurred over the whole area just as in the control dish. In these specimens the solid iodine has been mixed up with the lanoline and wax basis, and that might be the reason for its failure, and therefore we have gone further into the matter.

Next, the iodine was mixed with iodide of potash in the ordinary proportions so as to aid its solution, but here there is still no action. Again, the ordinary tincture of iodine (B.P.) has been used without any ointment basis, pieces of filter paper being saturated with the tincture and applied in the same manner as the paste, but still growth has occurred.

I must say that these results have surprised me very much, as I was always under the impression that iodine was quite a useful antiseptic, though I knew that it was not so good as was generally supposed. Certainly the clinical results in wounds in war, so far as they have come under my notice, coincide with these experimental results, for I have had several very septic cases which I have been surprised to learn afterwards had been freely treated with iodine soon after their infliction and shortly before I saw them.

Alcohol (on Filter Paper.)

Some disbelievers in iodine have, I understand, expressed the opinion that any good effect of the iodine solution was due to the alcohol, but I show you here a plate where absolute alcohol has been used and where uninterrupted growth has gone on. This is interesting, because it is not uncommon to see needles, etc., especihypodermic needles, "disinfected" with methylated spirit.

Other Antiseptics Tested.

Of these the following gave definitely good results: *Paraform* 5 per cent. in paste; *Bichloride of mercury*; 0·2 per cent. in paste (=1 in 500); *Oil of cinnamon*; *British Lysol* (Liq. cresol. saponat—Martindale), 20 per cent. paste; *Balsam of Peru, (pure)*.

Double cyanide of mercury and zinc, 10 per cent. in paste. This shows no action. Dry cyanide powder placed under an agar slab also causes no inhibitory effect, but if the powder is moistened with a little water, the inhibitory effect is very marked. I confess that I do not as yet understand this. It is possible that there may be some dissociation of the double cyanide. I would warn those who wish to use the double cyanide in wounds that they must not put it into a lead tube, for the lead is rapidly attacked and cyanide of lead is formed which is poisonous.

Less active were: *Salicylic acid*, *Japanese powder* (Salicylic acid 5, boric acid 15, lanoline and wax base 80); *Oil of origanum*; *Hycol*; *Lysol*; *Cyllin*; *Izal*; while *Oil of turpentine*, *Oil of eucalyptus*, *Friar's balsam* (*pure*); *Dr. Mencière's embalming solution* (*pure*); *Colloidal mercury*, *selenium*, *copper*, *and silver*, showed no inhibitory action.

Except the three in which the strength is specified, all these were combined with lanoline and wax paste in the proportion of 20 per cent. The results with carbolic acid, 20 per cent. and 30 per cent. were uniform with those with Tricresol and were constant.

Significance of Clear Area.

"If one examines a plate under a low power of the microscope, say with a 2-inch lens, 3 hours after inoculation, one can already see colonies quite distinctly towards the periphery of the agar, but none can be detected towards the centre, in the area which will subsequently remain clear. In rather less than 5 hours after the preparation of the plate the colonies can be perceived with the naked eye. From this we learn that at some period of time within 3 hours after the preparation of the plate, and probably a good deal less than that, the antiseptic has penetrated through ¼ inch of solid agar in sufficient amount to arrest the growth of the bacteria; indeed, seeing the extent of the clear area, it must have penetrated to a greater distance than ¼ inch.

There is another point which I wish you to note in the preparation (the carbolic acid or cresol plate)—that the colonies at the edge of the clear area are quite small and that they increase in size as they lie farther away from it. From this it is clear that the antiseptic did not cease to penetrate at the end of two or three hours. It is true, it only got through in amount sufficient to check growth before colonies had formed in the area shown by the clear space, but it continued to come through to a greater and greater distance, and as it came through it arrested the growth of colonies which had already become visible. All antiseptics, however, do not act in this way. In several of the others you will see that the colonies at the edge of the clear centre are large—indeed, sometimes as large as any outside, showing that there was no continuance of the diffusion of the antiseptic; evidently the full amount came through quickly and the full effect was obtained in the first three hours. The continuance of the diffusion is a very important point and one in favour of cresol and carbolic acid. I think we may therefore conclude that when carbolic acid or cresol is combined with this base a certain amount is stored up and only parted with slowly, whereas in other cases there is no such storing up, the antiseptic passing through quickly and exercising its full effect at once. We are inclined to think that it is the wax to a greater extent than the lanoline which holds up the carbolic acid, because the clear area is larger where the basis is lanoline alone than with the lanoline and wax base.

Scope of Investigations.

"This is not a method to test whether a particular antiseptic will or will not kill bacteria, or in what concentration or after what length of time it will do so. The method which I have now shown you enables us to study the action on bacteria at a distance and in different surroundings, as we have to do in connexion with the treatment of wounds.

"It is quite possible that we may come across some better antiseptics or some better method of applying them in the course of our study.

"The explanation of the diffusion is partly osmotic pressure and probably partly volatility of the antiseptic. Another thing also happens which affects diffusibility—viz., combination of the antiseptic with substances in the surrounding medium. This is probably the explanation of the result with iodine, which, though an active antiseptic when free in the presence of naked bacteria, has a marked teudency to combine with a great variety of substances which diminish or destroy its antiseptic qualities. Hence the reason why it does not diffuse, as an antiseptic, in blood and agar. (We have since found that one iodine plate prepared as above and covered with starch paper shows no starch reaction after 24 hours.)"

Bearing of Results on Treatment of Wounds.

"Now we have learned from laboratory experiments that quite a number of antiseptic substances are able to penetrate agar and blood clot to a distance of ¼ to ½ inch and still retain sufficient antiseptic power to prevent the growth of organisms, and that this penetration takes place in less than three hours. We have learned in guinea-pigs in the case of virulent bacillus pyocyaneus—quite a different class of organism in its relation to the guinea-pig from the pyogenic cocci in their relation to man—that the development of infection can be delayed from four to five days by these pastes provided the paste is put in early, within 15 minutes: and that when the wound is cleaned out at the end of that time healing rapidly occurs. From the first observation on man we learn that after one application of one of these pastes to a wound which has not been badly infected no signs of infection have occurred in that region for four days. From the second observation we find that no suppuration or other sign of infection occurred for ten days, although a great part of the tissue bordering on the wound was actually dead, and this was a much dirtier wound than the other.

"I cannot but think that the facts point to the possibility that this part of the puzzle as regards the treatment of wounds can be solved satisfactorily, and that the danger caused by the delay in getting the cases to a place where proper attention can be given to the wounds can be reduced if not entirely removed."

Other questions considered were, *Evidence of death of bacteria*; *Effects of different bases*; *Spore-bearing bacilli*; and experiments were made with blood, with guinea-pigs, and cresol and carbolic pastes were used in practice with satisfactory results. The extracts here given only suffice to outline the argument and indicate the direction of the investigation. The fuller report, which is defined as preliminary, is given in *The Lancet* of Feb. 27.

March 17.

REGULAR FORCES. ARMY VETERINARY CORPS.

To be temporary Lieuts: J. W. Bennett, B. M. Gunn, A. V. Meeke, W. B. Howe. Dated Mar. 1.

Special Reserve of Officers Supplementary to Regular Units or Corps.

ARMY VETERINARY CORPS.

To be Lieuts. (on probation): M. Glynn, F. J. Shearman, A. Monro. Dated Mar. 1.

TERRITORIAL FORCE. ROYAL ENGINEERS.

3rd London Field Co., 2nd London Divis. Engrs.—Capt. W. S. Mulvey to be Maj. Dated Feb. 19.

ARMY VETERINARY SERVICE

Extract from *London Gazette*,

WAR OFFICE, WHITEHALL, Mar. 12.

REGULAR FORCES. ARMY VETERINARY CORPS.

To be temporary Lieuts.:—

S. E. Robson. Dated Feb. 15.
G. W. Roberts. Dated Feb. 16.
H. Walpole. Dated Feb. 22.
A. E. Roberts. Dated Feb. 23.
J. Scott. Dated Feb. 24.

March 16.

REGULAR FORCES. ARMY VETERINARY CORPS.

Capt. E. E. Bennett, Ret. List, to be temporary Maj. Dated Dec. 12.

Date of appointment to a temporary Lieutcy. of A. Young is Aug. 13, not as in *Gazette* Nov. 24.

Temporary Qmr. and Hon. Lieut. J. Mullane relinquishes his commn. Dated Mar. 17.

Personal.

GIBSON-RENFREW.—On the 8th inst., at 257 Bath Street, Glasgow, by the Rev. George L. Marr, B.D, Dalziel Parish, Motherwell, John Gibson, M.R.C.V.S., Dundee, to Helen Blue, daughter of John Renfrew, M.R.C.V.S., and Mrs. Renfrew, Glasgow.

VETERINARY PRACTIONERS AND A.V.C.

Sir,

This is a time of exceptional stress, and we as a profession ought to be unselfish enough to do our utmost to help the nation to meet it successfully. Let us have no cavilling. Where two qualified men are in a practice one should go and, moreover, place himself unreservedly in the hands of the A.V.C. Terms should be a secondary matter altogether to the welfare of the dear old islands which we all love so much. All cannot go, some in fact are staying at home and so allowing others to go; these are doing their share, but everyone who is thought suitable and can get away should join the A.V.C. at once, and accept the terms offered. These are the views of one who came out last September.—Yours sincerely,

A.V.C. (T.F.)

Cruelty Prosecution at Norwich.

FRACTURE OF HORSE'S TONGUE.

At Norwich Police Court on Monday, 8th inst., before Mr. E. Wild (Chairman) and Mr. George Jewson, John Garrod, labourer, of 4 Cheshill Place, Southwell Road, was summoned for cruelty to a horse by unreasonably injuring its tongue at the Bold Napier, Southwell Road, on February 21st.

Defendant pleaded guilty to injuring the horse, but denied wilful intent.

The information was laid by Inspector Armstrong of the R.S.P.C.A.

Cecil Read, dealer, of 1 Holl's lane, Queen's Road, said he was in the stable yard of the Bold Napier. His horse was there with a halter on. Witness and another man named Jolly were trying to give the horse a "ball." Defendant then came forward and said, "I'll show you how to give it a ball." He got hold of the horse's tongue, much against witness' wish. The horse reared, and defendant held on to its tongue.

The Clerk: What happened?—The tongue came out.

Do you mean the whole of it or a part?—The part he had gripped in his hand.

The Bench: Was the horse killed?—No, it is recovering.

The Clerk: It will never gather its food again?—I don't know. It has lost five inches of its tongue.

The Chairman: Was the tongue in the man's hand?—No, it fell to the ground.

In reply to the Bench, witness said that Jolly, who was with him, knew how to give a horse a ball.

By Inspector Armstrong: I asked defendant three times to let go the horse's tongue, but he wouldn't.

What did he do when the tongue came out?—He threw it against a tub and said, "That's the way to give a horse a ball."

Defendant: Who gave me the ball?—I didn't. I ex- you took it out of Jolly's hand.

Philip Jolly said he was in rather a bit of a muddle with the horse, and wanted a little help. The horse rather tricky, and defendant assisted. Witness did not ask him to do so. Read could not keep the horse still.

The Bench: Did you hand defendant the ball?—No.

How did he get it?—Read gave it to him.

The Chairman: You were paid to give the horse the ball, and you allowed defendant to take the job out of your hands.

In reply to Mr. Jewson, witness said it was a hackney horse. It was not valuable, being worth some £3 or £4.

Defendant contended that it was a pure accident and happened in an instant. There was no intention of ill-treatment. He had given "balls" to hundreds of horses.

Herbert Buckingham. M.R.C.V.S., 19 Earlham Road, said he examined the horse. It was minus five inches of tongue. The end of the tongue was ragged, but was now healing.

The Clerk: Was it a very unusual thing to happen in giving a ball?—I have never known it to happen before, although I know of a case where a tongue has come out by being corded. The tongue was perfectly healthy, and there was no excuse for what happened.

In reply to the Bench, witness said that the tongue had not yet healed. There was still a certain soreness. The loss of a part of its tongue was a considerable inconvenience to the horse, which would require special feeding.

Inspector Armstrong: Is it a proper thing to stick to a horse's tongue when it plunges about?—Certainly not.

Jolly, recalled, said it was done instantly, by "one up and down movement."

In fining the defendant £2, including costs, the Chairman said defendant was a good deal to blame, although they quite believed he did not set about to injure the horse intentionally. Otherwise it would have been an act of unspeakable cruelty. Defendant was evidently somewhat excited and angry, and would not let go of the horse's tongue. He had no right to hang on to it as he did. That was a very grave blunder. —*Eastern Daily Press.*

Petrol in Wound Treatment.

Dr. G. Arbour Stephens, Swansea, writes in *The Brit. Med. Jnl.* in connection with Mr. Waterhouse's article on ether in surgical therapeutics :—

"Perhaps you will allow me to draw attention to the great similarity of refined petrol as regards its physical properties to ether. The low boiling-point and low surface tension, as well as the power of dissolving fats, are common to both petrol and ether, but whereas the latter is expensive and scarce, petrol is cheap, plentiful, and readily accessible at all times and in all places. Petrol, like ether, possesses the quality of 'cleaning' the micro-organisms themselves, and cleaned organisms are far less harmful than those which are surrounded by their metabolic products."

"It may be of interest to know that a solution of iodine in petrol can be made, which possesses the additional quality of cheapness when compared with tincture of iodine, for which alcohol is required, and already several firms have got this product on the market under special trade names."

Science and Assertion.

The Medical Committee of the British Science Guild has issued a resolution dealing with the question of inoculation for typhoid, and making special reference to the advertisements of the British Union for the Abolition of Vivisection. The resolution takes particular exception to the statement that inoculation has been "proved to be an utterly useless and dangerous practice." It points out that the evidence in favour of inoculation is contained in a large mass of scientific literature written by many expert observers, and based upon hundreds of thousands of observations on men and animals. On the other hand, the Committee states that it knows of no scientific treatise of any value to the contrary, and does not believe that such a treatise has ever been attempted.

It goes on to make certain observations which are of general application. "No scientific theorem is accepted nowadays by scientific men without the consideration of a vast amount of evidence, generally accepted in innumerable scientific publications, the presentment of which even in abstract would fill whole numbers of any daily or weekly periodical. On the other hand, any ignorant or unreasonable person can express in a single sentence his disbelief of this evidence, and thus attempt to dissuade the public from availing themselves of the advantages which science has conferred. Those who are seeking to benefit humanity by medical research are therefore always placed at a disadvantage in public discussions of this kind because they cannot give a full statement of their arguments, except in a lengthy scientific form, whereas anti-scientists can always pretend in a few words that such evidence has been refuted."—*British Medical Journal.*

Shortage of Manx Cattle.

Cattle and sheep are being exported from the Isle of Man at such a rate that, if an interdict is not placed upon exportation, in less than a couple of months the island will be threatened with a genuine shortage. The attention of the Lieutenant Governor having been called to this matter, his Excellency invited to a conference the President and some of the leading members of the Isle of Man Butchers' Association. From their statements, it appears that there are two main reasons for the threatened shortage. First, the fact that there is in almost every district, a positive want of feeding stuff; and it is feared that this want will go increasing until the new grass comes in. Second, the competition of buyers from England: and the deputation told his Excellency that if the exportation of cattle was continued as at present, in May and June there would be no fat cattle left on the island.

The Register, 1915.

The Register of Veterinary Surgeons, 1915, is now issued. Naturally it presents a strong likeness to its predecessors, but there are several features which may be noted. At Page 55 is the Supplemental Charter of 1914: and the revised list of Preliminary Examinations at p. 88. The list of Hon. Associates has been corrected and brought up to date: there are now 46 including 12 new names (Twenty-two names of deceased Hon. Associates have been removed).

Members on the list number 3425 against 3408 last year, but there are the names of 18 members whose addresses are unknown. Register III., "Existing Practitioners" now carries 176 names against 188 last year. A copy of the revised Tuberculosis Order, 1914, appears at p. 430.

The most noticeable feature is the great increase in the list of officers of the Army Veterinary Corps, which, with the Special Reserve and Territorial Force now numbers 450. Since the Register went to press at least 30 additional officers have been gazetted.

DISEASES OF ANIMALS ACTS 1894 TO 1914, SUMMARY OF RETURNS.

Period.	Anthrax		Foot-and-Mouth Disease.		Glanders.†		Parasitic Mange. ‡		Sheep Scab.	Swine Fever.	
	Outbreaks (a)	Animals.	Outbreaks (a	Animals.	Outbreaks (b)	Animals.	Outbreaks (b)	Animals.	(b)	Outbreaks (a)	Slaughtered.
GT. BRITAIN. Week ended March 13	12	12							9	59	286
Corresponding week in 1914 ...	18	18			2	5	52	104	3	59	495
Corresponding week in 1913 ...	20	20				3	58	117	5	37	587
Corresponding week in 1912 ...	18	18			3	6	81	148	5	69	621
Total for 11 weeks, 1915	184	204			7	11			123	806	3334
Corresponding period in 1914 ...	209	223	9	65	24	64	853	1623	122	609	5516
Corresponding period in 1913 ...	147	161			35	108	875	1884	97	374	4391
Corresponding period in 1912 ...	280	309			36	82	1397	3258	134	657	8156

‡ The Parasitic Mange Order of 1911 has been suspended as from 6th August, 1914.

(a) Confirmed. (b) Reported by Local Authorities. † Counties affected, animals attacked:

Board of Agriculture and Fisheries, March 16, 1915